

patients with contraindications or potential procedure-related risks are excluded, EECF presents a favourable efficacy/safety profile and is, therefore, a valid treatment for refractory angina. In patients with increased risk of EECF-related adverse events,¹⁷ however, SCS seems to be the first-choice treatment.

Current evidence, on the other hand, does not support the utilisation of MLR and angiogenic therapy in the treatment of patients with refractory angina.

REFERENCES

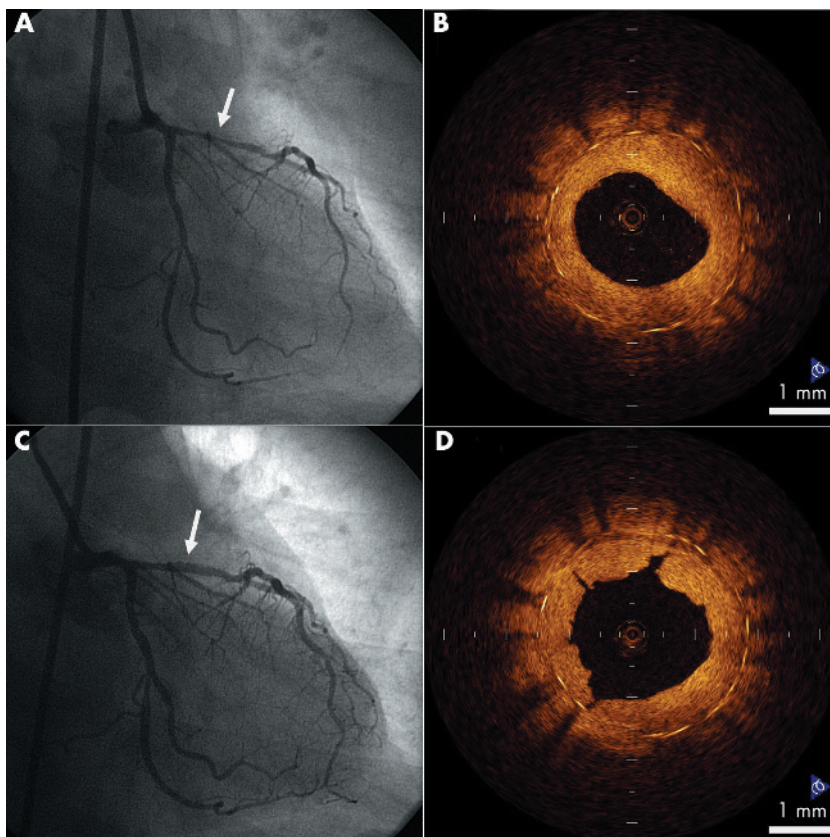
- Kim MC, Kini A, Sharma SK. Refractory angina pectoris. *J Am Coll Cardiol* 2002;**39**:923–34.
- TenVaarwerk AM, Jessurun GAJ, DeJongste MJL, for the Working Group on Neurocardiology, et al. Clinical outcome of patients treated with spinal cord stimulation for therapeutically refractory angina pectoris. *Heart* 1999;**82**:82–8.
- Di Pede F, Lanza GA, Zuin G, et al. Spinal cord stimulation for refractory angina pectoris: data on clinical outcome from the prospective Italian registry. *Am J Cardiol* 2003;**91**:951–55.
- Mannheimer C, Eliasson T, Augustinsson LE, et al. Electrical stimulation versus coronary artery bypass surgery in severe angina pectoris The ESBY Study. *Circulation* 1998;**97**:1157–63.
- Ekre O, Narsell H, Währborg P, et al. Spinal cord stimulation and coronary artery bypass grafting provide equal improvement in quality of life. Data from the ESBY study. *Eur Heart J* 2002;**23**:1938–45.
- Sgueglia GA, Sestito A, Spinelli A, et al. Long-term follow-up of patients with cardiac syndrome X treated by spinal cord stimulation. *Heart* 2007;**93**:591–7.
- Eddicks S, Maier-Hauff K, Schen M, et al. Thoracic spinal cord stimulation improves functional status and relieves symptoms in patients with refractory angina pectoris: the first placebo-controlled randomised study. *Heart* 2007;**93**:585–90.
- Saririan M, Eisenberg MJ. Myocardial laser revascularization for the treatment of end-stage coronary artery disease. *J Am Coll Cardiol* 2003;**41**:173–83.
- Stone GW, Teirstein PS, Rubenstein R, et al. A prospective, multicenter, randomized trial of percutaneous transmyocardial laser revascularization in patients with nonrecanalizable chronic total occlusions. *J Am Coll Cardiol* 2002;**39**:1581–7.
- Leon MB, Kornowski R, Downey WE, et al. A blinded, randomized, placebo-controlled trial of percutaneous laser myocardial revascularization to improve angina symptoms in patients with severe coronary disease. *J Am Coll Cardiol* 2005;**46**:1812–19.
- Salem M, Rotevatn S, Stavnes S, et al. Usefulness and safety of percutaneous myocardial laser revascularization for refractory angina pectoris. *Am J Cardiol* 2004;**93**:1086–91.
- McNab D, Khan SN, Sharples LD, et al. An open label, single-centre, randomized trial of spinal cord stimulation vs. percutaneous myocardial laser revascularization in patients with refractory angina pectoris: the SPIRiT trial. *Eur Heart J* 2006;**27**:1048–53.
- Grines CL, Watkins MW, Helmer G, et al. Angiogenic Gene Therapy (AGENT) trial in patients with stable angina pectoris. *Circulation* 2002;**105**:1291–7.
- Kastrup J, Jorgensen E, Ruck A, et al. Euroinject One Group. Direct intramyocardial plasmid vascular endothelial growth factor-A165 gene therapy in patients with stable severe angina pectoris A randomized double-blind placebo-controlled study: the Euroinject One trial. *J Am Coll Cardiol* 2005;**45**:982–8.
- Bonetti PO, Holmes DR, Lerman A, et al. Enhanced external counterpulsation for ischemic heart disease. What's behind the curtain? *J Am Coll Cardiol* 2003;**41**:1918–25.
- Arora RR, Chou TM, Jain D, et al. The multicenter study of enhanced external counterpulsation (MUST-EECP): effect of EECF on exercise-induced myocardial ischemia and anginal episodes. *J Am Coll Cardiol* 1999;**33**:1833–40.
- Soran O, Kennard ED, Kfoury AG, Kelsey SF, for the IEPR Investigators. Two-year clinical outcomes after enhanced external counterpulsation (EECP) therapy in patients with refractory angina pectoris and left ventricular dysfunction (report from the International EECF Patient Registry). *Am J Cardiol* 2006;**97**:17–20.
- Gibbons RJ, Abrams J, Chatterjee K, et al. ACC/AHA 2002 guideline update for the management of patients with chronic stable angina—summary article: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. *J Am Coll Cardiol* 2003;**41**:159–68.
- Fox K, Garcia MA, Ardissino D, et al. Guidelines on the management of stable angina pectoris: executive summary. *Eur Heart J* 2006;**27**:1341–81.

IMAGES IN CARDIOLOGY

Optical coherence tomography after cutting balloon angioplasty

Optical coherence tomography (OCT) is a recently developed optical imaging technique that provides high-resolution (approximately 10–20 µm) cross-sectional images of vessels.

A 74-year-old man was admitted for chest pain. A coronary angiogram showed diffuse in-stent restenosis of an Express (Boston Scientific Corporation and Medinol Ltd) 2.75 × 15 mm stent which had been implanted in the left anterior descending coronary artery six months earlier (panel A; arrow). Using OCT (Image Wire, LightLab Imaging, Inc) imaging, well-apposed stent struts and neointima formation around the stent were clearly visualised (panel B). We performed angioplasty by using Cutting Balloon Ultra (Boston Scientific Corporation and Medinol Ltd) for this lesion. After the cutting balloon procedure, a coronary angiogram showed a very smooth lumen border (panel C; arrow). However, OCT imaging showed that the lumen surface was irregular with fissures of neointima formation. OCT imaging may be useful in assessing small structural details of the coronary artery, such as neointima formation after stent implantation and the presence of fissures after angioplasty.



T Kume, T Akasaka, K Yoshida
tteri@med.kawasaki-m.ac.jp

doi: 10.1136/hrt.2006.091595